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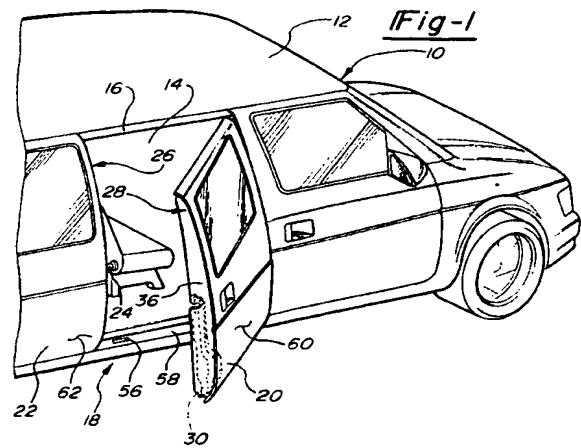
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### (54) Reinforced cargo door assembly.

(57) A cargo door assembly for pivotally mounted side doors in a van-type vehicle is provided with an improved reinforcing beam (30). The beam (30) extends vertically along the shut face of one door (20) of the assembly and has structure at its top for mounting the door latch (40) and a hook (54) at its bottom unengageable with the vehicle body (12) at its sill (58). The beam (30) is wider at its bottom than at its top and presents a simply supported beam to the sidewall (3) of the vehicle, enhancing its capacity to handle lateral loading, including impact loading.



EP 0 659 601 A1

The present invention relates generally to vehicle doors, and more specifically to reinforcement of vehicle doors arranged in the side of van-type vehicles.

In the manufacture and sale of automotive vehicles of the type generally referred to as vans, it is customary to provide for ingress and egress to rear portions of the vehicle body through a rearwardly placed side door or doors positioned on at least one side of the vehicle. The doors are generally of two types: sliding doors and centre opening, outwardly swinging cargo doors.

Engineering development activity relating to the resistance of body structures of these van-type vehicles to the imposition of external forces has resulted in the establishment of certain design goals for enhancing the resistance of side vehicle structures to the imposition of such loads, particularly impact loads.

It is known in the prior art to provide reinforcing structure for side doors of vehicles. Particularly well-known are generally horizontally running reinforcing beams in passenger vehicles; U.S. Patent 4,013,317 is exemplary of such designs. It is also known to reinforce side cargo doors in vans through interengaging structure disposed between the two doors. Applicant's co-pending U.S. application 07/997,067, discloses such an approach. The prior art, however, while effective for its intended purpose, reinforces through structure not self-contained in the door and does not make use of the load supporting strength provided by other portions of the vehicle body. In applicant's other design, which is the subject of the co-pending application '067, the reinforcement takes place solely between the two cargo doors at their interface. This positioning of the interlocking devices of that design necessitates the carrying of the extraneous hook and catch structure on door surfaces exposed to vehicle users when the doors are open. This is considered undesirable in certain applications.

Because of the shortcomings and the prior art, it is considered desirable that the cargo door reinforcement be provided which is integral with the door system and coacts with the vehicle body.

The desired advantages are realised in the present invention through providing a cargo door assembly that includes a pair of longitudinally spaced cargo doors pivotally mounted for movement between open and closed positions and having a latch assembly interlocking the two doors in which a vertical reinforcement beam is carried with one door and extends vertically from the latch to the bottom of the door and includes a hook portion which is received in an aperture in the vehicle body to resist inward movement of the door with respect to the body.

According to one aspect of the present invention, the reinforcement beam is provided in a fashion in which it is carried within one of the doors of the cargo door system.

The invention will now be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a portion of the side of a van-type vehicle with one cargo door open;

Figure 2 is an enlarged perspective view of a reinforcing beam according to the present invention; and

Figure 3 is a side view of the reinforcing beam.

Turning now to drawings, and in particular to Figure 1 thereof, a van indicated generally at 10 is illustrated as comprising a body 12 having an aperture 14 formed through its side 16, and a cargo door assembly indicated generally at 18 for closing the aperture 14. The cargo door assembly 18 is indicated as including a first door 20 and a second door 22 positioned rearwardly in the vehicle with respect to the first door. The first door 20 is preferably wider, that is, more longitudinal extent, than the second or rear door 22. The doors 20 and 22 are pivotally mounted on the vehicle body 12 in a known manner as through hinges for pivotal movement between open and closed position. The door 20 in Figure 1 is illustrated in a partially open position.

As is customary, the doors 20, 22 are configured to be latching secured to each other when in the closed position by provision of a striker 24 projecting forwardly from the forward face 26 of the door 22 and a latch (not shown in detail) carried on the trailing edge 28 of the door 20.

The forward door 20, according to the present invention, is modified from customary designs by provision of a reinforcing beam 30 carried with the door 20. The door 20 is otherwise of conventional construction, having an outer panel 32 and an inner panel 34. The outer panel 32 and the inner panel 34 are interconnected on the trailing edge 28 of the door 32 by a generally vertical panel 36, preferably formed as a flat panel interconnecting panels 32, 34.

The reinforcing beam 30 is carried between the outer panel 32 and the inner panel 34 and extends vertically from approximately the mid-vertical point of the door, and is preferably formed as a stamping and includes an upper end of generally L-shaped configuration indicated at 38 which has a laterally projecting side 40 into which is formed a fish mouth slot 42 for receiving the striker 24. A plurality of apertures 44 are arrayed about the fish mouth 42 for conventional mounting of a latch of known design. The upstanding wall 40 is carried in abutting relationship with a forward surface of the end wall 36 of the door 20 and is preferably secured thereto by fixed mechanical means such as welding. At the upper end 38 of the reinforcing beam 30, a longitudinally extending wall 46 projects generally perpendicularly from the wall 40. The outer surface 48 of the wall 46 is configured to project laterally away from the wall 46 along the vert-

ical extent of the beam 30 to form an enlarged bulbous portion 50 proximate the lower end of the beam 30. At the lower end 52 of the beam 30, a hook portion 54 is formed which projects generally laterally inwardly.

A slot 56 is formed in a lower sill portion 58 of the body 12 for receiving the hook portion 54. A reinforcing plate, which may be an L-shaped plate such as indicated at 58, loosely receives the hook portion 54 when inserted in slot 56.

Upon imposition of an excessive load on outer surfaces 60, 62 of front and rear doors 20, 22, respectively, the tendency of the doors to deflect inward toward the interior of the vehicle 10 is resisted in part by the reinforcement beam 30 which is carried as a simply supported beam between the latch striker 24 and the interaction of the hook portion 54 with the plate 58.

### Claims

1. A cargo door assembly for closing an aperture in the side of a vehicle body comprising:

a first door (20) hingedly connected to the body (12) for movement about a hinge between an open position and a closed position;

a second door (22) hingedly connected to the body (12) for movement about a second hinge between an open position and a closed position;

a latch (42) carried on one (20) of the doors;

a striker (24) carried on the other (22) of the doors for engagement with the latch;

a reinforcing beam (30) carried with the one door (20) and extending vertically from the latch to the bottom of the one door, the beam having a hook portion (54) formed at its lower end (52) projecting laterally inwardly toward the vehicle body (12); and

means (58) defining an aperture (56) in the body (12) in juxtaposition with the hook portion (54) operative to resist inward movement of the door from the closed position with respect to the vehicle body (12).

2. A cargo door assembly as claimed in claim 1, wherein the one door includes an inner panel and an outer panel carried in laterally spaced relationship and the reinforcing beam is carried intermediate inner and outer panels.

3. A cargo door assembly as claimed in claim 1, wherein the latch is fixedly mounted adjacent the top of the reinforcing beam.

4. A cargo door assembly as claimed in claim 1, wherein the reinforcing beam is formed to have an irregular cross section and is substantially

greater in lateral thickness proximate the lower end of the reinforcing beam.

5. A cargo door assembly as claimed in claim 2, wherein the one door includes a flat closure panel interconnecting the inner and outer panels and the reinforcing beam includes a flat panel fixedly secured to the closure panel.

6. A cargo door assembly as claimed in claim 5, wherein the reinforcing beam is formed to have an irregular cross section and is substantially greater in lateral thickness proximate the lower end of the reinforcing beam.

7. A cargo door assembly as claimed in any one of the preceding claims, wherein the reinforcing beam is formed as a stamping.

8. A cargo door assembly for closing an aperture in the side of a vehicle body comprising:

a first door hingedly connected to the body for movement about a hinge between an open position and a closed position;

a second door hingedly connected to the body for movement about a second hinge between an open position and a closed position;

a latch carried on one of the doors;

a striker carried on the other of the doors for engagement with the latch;

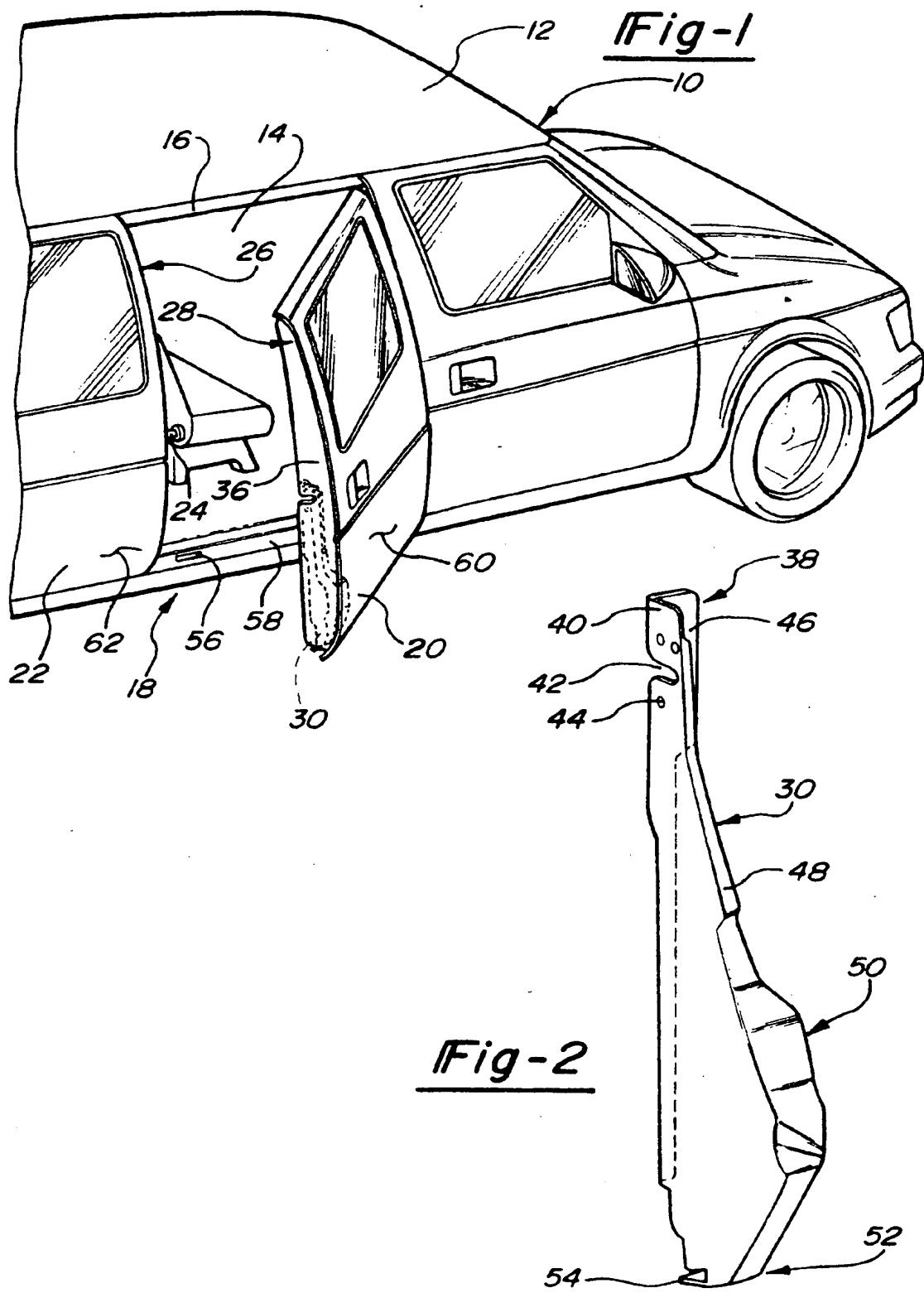
a reinforcing beam carried with the one door and extending vertically from the latch to the bottom of the one door, the beam having a hook portion formed at its lower end projecting laterally inwardly toward the vehicle body, the latch being fixedly secured adjacent the top of the reinforcing beam; and

means defining an aperture in the body in juxtaposition with the hook portion operative to resist inward movement of the door from the closed position with respect to the vehicle body.

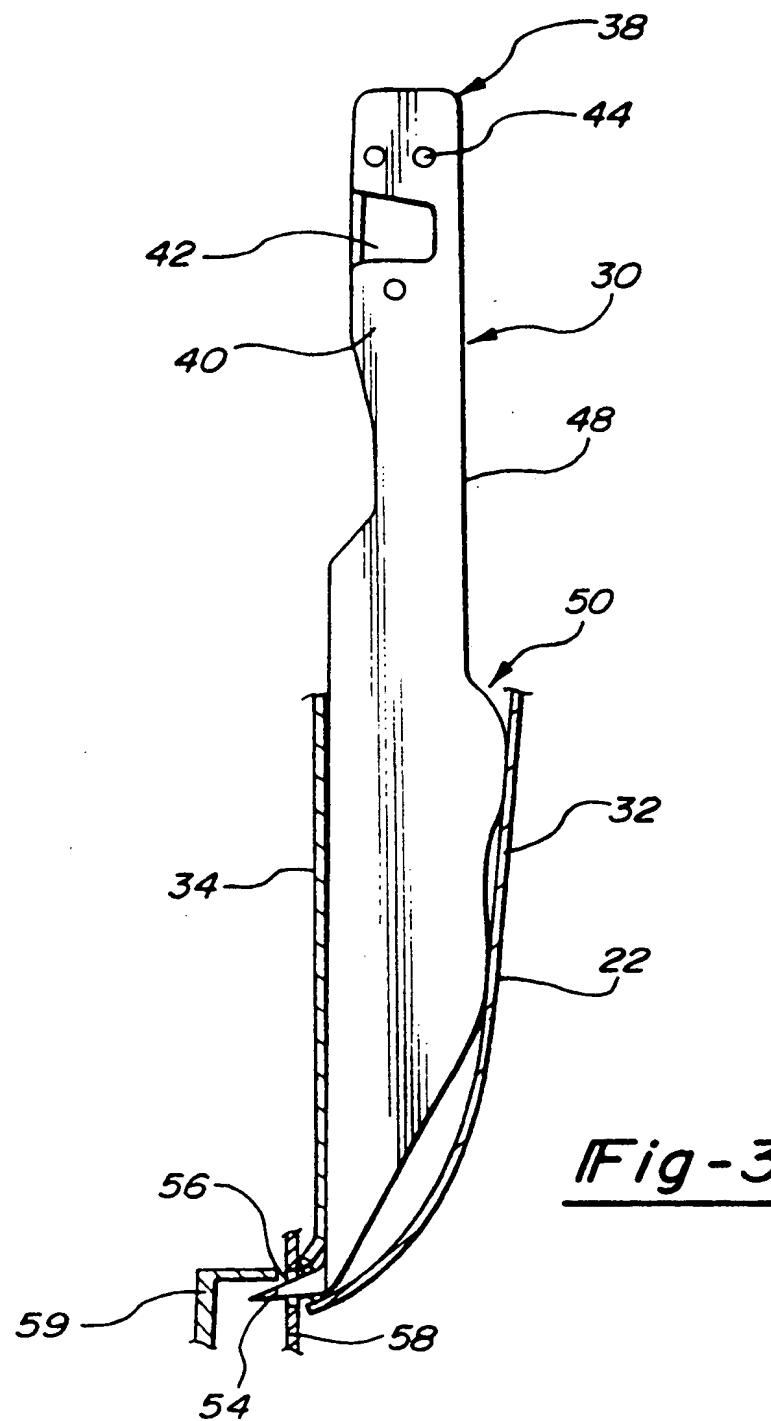
9. A cargo door assembly as claimed in claim 8, wherein the reinforcing beam is formed to have an irregular cross section and is substantially greater in lateral thickness proximate the lower end of the reinforcing beam.

10. A cargo door assembly as claimed in claim 9, wherein the reinforcing beam is formed as a stamping.

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## EUROPEAN SEARCH REPORT

Application Number  
EP 94 30 9520

| DOCUMENTS CONSIDERED TO BE RELEVANT   |   |   | CLASSIFICATION OF THE APPLICATION (Int.Cl.6) |
|---|---|---|--|
| Category  | Citation of document with indication, where appropriate, of relevant passages     | Relevant to claim   |  |
| A   | EP-A-0 348 034 (FORD MOTOR COMPANY)<br>* figures 3-7 *                            | 1   | B60J5/04                                     |
|   | ---   |   |  |
| A   | DE-A-35 37 304 (PORSCHE)<br>* column 2, line 30 - column 3, line 11;<br>figures * | 1   |  |
|   | ---   |   |  |
| A   | US-A-4 307 911 (PAVLIK)<br>* abstract; figures *                                  | 1   |  |
|   | ---   |   |  |
| A   | US-A-3 713 691 (BAYLESS)<br>* abstract; figures *                                 | 1   |  |
|   | -----   |   |  |
| The present search report has been drawn up for all claims  |   |   |  |
| Place of search<br><br>THE HAGUE  | Date of completion of the search<br><br>12 April 1995                             | Examiner<br><br>Vanneste, M   |  |
| CATEGORY OF CITED DOCUMENTS   |   | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or<br>after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>.....<br>& : member of the same patent family, corresponding<br>document |  |
| <small>EPO FORM 1501/01A2 (P0001)</small><br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another<br>document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |   |   |  |

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